AFCTN Test Report 94-095

AFCTB-ID 94-064

Technical Publication Transfer Using:

O'Neil & Associates, Inc. Data Supporting:

ESC/MSL MILSTAR Program TO 31R2-2T-12

(Contract #F19628-89-C-0131)

MIL-D-28000A (IGES)
MIL-M-28001B (SGML)
MIL-R-28002A (Raster)
MIL-D-28003 (CGM)
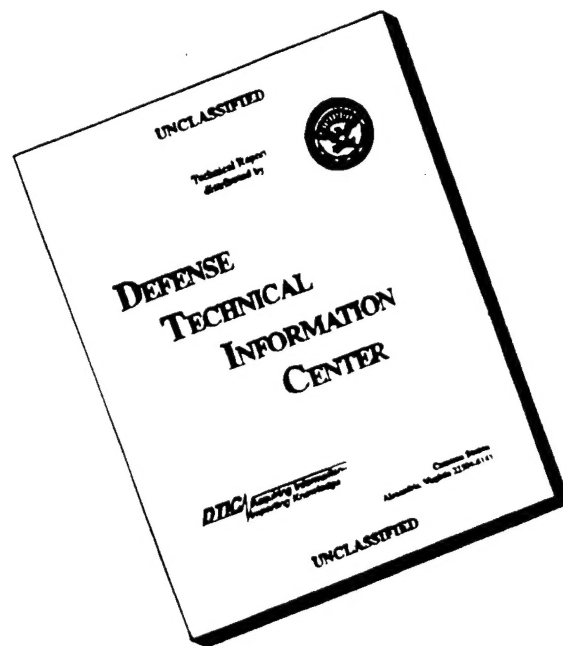
Quick Short Test Report

30 May 1994

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MIL-D-28003 (CGM)

Quick Short Test Report

30 May 1994

Prepared By
Air Force CALS Test Bed
Wright-Patterson AFB, OH 45433

AFCTB Contact
Gary Lammers
(513) 427-2295

AFCTN Contact
Mel Lammers
(513) 427-2295

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Air Force CALS Test Bed

Notification of Test Results

30 May 1994

This notice documents the results of an Air Force CALS Test Bed (AFCTB) Quick Short Test (QSTR) evaluation of data submitted by:

O'Neil & Associates, Inc.

Identified as follows:

Title:	**Technical Publication Transfer TO 31R2-2T-12**
Program:	**MILSTAR**
Program Office:	**ESC/MSL, Hanscom AFB**
Contract No.:	**F19628-89-C-0131**
QSTR No.:	**AFCTB-ID 94-064**

Received on the following media: **9-Track Tape**

The results of the QSTR evaluation are as follows:

MIL-STD-1840A Standard	**Pass**
MIL-STD-1840A Media Format:	**Pass**
MIL-D-28000A IGES:	**Pass**
MIL-M-28001A SGML:	**Pass**
MIL-R-28002A Raster:	**Pass**
MIL-D-28003 CGM:	**Pass**

Formal results with associated disclaimer are documented and available from the AFCTB.

Air Force CALS Test Bed
HQ ESC/AV-2P
4027 Colonel Glenn Highway, Suite 300
Dayton, OH 45431-1672
Phone: 513-257-3085   FAX: 513-257-5881

Contents

1. Introduction

1.1 Background

The Department of Defense (DoD) Air Force Continuous Acquisition and Life-cycle Support (CALS) Test Network (AFCTN) is conducting tests of the military standard for the Automated Interchange of Technical Information, MIL-STD-1840A, and its companion suite of military specifications. The AFCTN is a DoD sponsored confederation of voluntary participants from industry and government managed by the Electronic Systems Center (ESC).

The primary objective of the AFCTN is to evaluate the effectiveness of the CALS standards for technical data interchange and to demonstrate the technical capabilities and operational suitability of those standards. Two general categories of tests are performed to evaluate the standards; formal and informal.

Formal tests are large and comprehensive, which follow a written test plan, require specific authorization from the DoD, and may take months to prepare, execute, and report.

Informal tests are quick and short, used by the AFCTN technical staff, to broaden the testing base. They include representative samples of the many systems and applications used by AFCTN participants. They also allow the AFCTN staff to gain feedback from many industry and government interpretations of the standards, to increase the base of participation in the CALS initiative, and respond to the many requests for help that come from participants. Participants take part voluntarily, benefit by receiving an evaluation of their latest implementation (interpretation) of the standards, interact with the AFCTN technical staff, gain experience using the standards, and develop increased confidence in them. The results of informal tests are reported in Quick Short Test Reports (QSTRs) that briefly summarize the standard(s) tested, the hardware and software used, the nature of the test, and the results.

1.2 Purpose

The purpose of the informal test, reported in this QSTR, was to analyze O'Neil & Associates' interpretation and use of the CALS standards in transferring technical publication data. O'Neil used its CALS Technical Data Interchange System to produce data, in accordance with the standards, and delivered it to the AFCTN technical staff as a two tape set using 9-track magnetic tapes.

2. Test Parameters

Test Plan:	AFCTB 94-064
Date of Evaluation:	30 May 1997
Evaluator:	George Elwood Air Force CALS Test Bed DET 2 HQ ESC/AV-2P 4027 Colonel Glenn Hwy Suite 300 Dayton OH 45431-1672
Data Originator:	Larry C. McKinley O'Neil & Associates, Inc. 425 North Findlay Street Dayton OH 45404-2203 (513) 461-1852
Data Description:	Technical Manual Test 1 Document Declaration file 4 Document Type Definitions (DTDs) 68 Initial Graphics Exchange Specification (IGES) files 1 Text/Standard Generalized Markup Language (SGML) file 7 Raster files 2 Computer Graphics Metafile (CGM) files

Data Source System:

1840

HARDWARE

386 PC

SOFTWARE

AFCTN Tapetool v1.2.10

IGES
- **HARDWARE**
  - Xerox 7650 Pro Imager
  - Xerox 6085 Workstation
- **SOFTWARE**
  - Xerox Expert Drafting v5.0
  - Conversion of IGES files v5.1
  - Xerox XTI v2.2
  - Xerox XPI Image Conversion v2.6

Text/SGML
- **HARDWARE**
  - 386 PC
- **SOFTWARE**
  - WordPerfect Intellitag v1.2
  - Exoterica Validator v1.1

Raster
- **HARDWARE**
  - HP Apollo 425T
- **SOFTWARE**
  - Auto-trol CCITT Gp4 Converter

CGM
- **HARDWARE**
  - HP/Apollo 425T
- **SOFTWARE**
  - Auto-trol Series 5000/CGM Converter 1.4

Evaluation Tools Used:

MIL-STD-1840A (TAPE)
- SUN 3/280
  - AFCTN *Tapetool v1.2.10 UNIX*
  - XSoft *CAPS/CALS v40.4*

MIL-D-28000 (IGES)
- SGI Indigo2
  - Cadkey *Cadkey v6.0*
  - IGES Data Analysis (IDA) *CALSView*
  - International TechneGroup Incorporated (ITI) *IGES/Works v2.0.0*

Sun SparcStation 2
    ArborText *iges2draw*
    Carberry *CADLeaf Plus v3.1*
    IDA *Parser/Verifier v92*
    IDA *IGESView v3.05*
    ITI *IGES/Works v1.3*
    Rosetta Technologies *Prepare*
    Rosetta Technologies *Preview v3.2*
PC 486/50
    AUTODESK AutoCAD R12
    IDA *IGESView Windows*

MIL-M-28001 (SGML)
PC 486/50
    Exoterica *XGMLNormalizer v1.2e3.2*
    Exoterica *Validator v2.0 exl*
    McAfee & McAdam *Sema Mark-it v2.3*
    Public Domain *sgmls*

MIL-R-28002 (Raster)
HP 735
    AFCTN *xrastb.hp*
    InterCAP *X-Change v7.82*
SGI Indigo2
    IDA *CALSView*
SUN SparcStation 2
    ArborText *g42tiff*
    Carberry *CADLeaf Plus v3.1*
    AFCTN *validg4*
    AFCTN *xrastb.sun4*
    IDA *IGESView v3.0*
    Island Software *IslandPaint v3.0*
PC 486
    IDA *IGESView Windows*
    Inset Systems *HiJaak Pro*
    Expert Graphics *RxHighlight v1.0*

MIL-D-28003 (CGM)
HP 735
    InterCAP *X-Change v7.82*
    ArborText *cgm2draw*
    Island Software *IslandDraw v3.0*
SGI Indigo 2
    IDA *CALSView*
SUN SparcStation 2
    Carberry *CADLeaf Plus v3.1*
    Island Software *IslandDraw v4.0*

PC 486/50
Advanced Technology Center
(ATC) *MetaView R 1.12*
ATC *MetaCheck R 2.10*
ATC *ForReview v2.0*
Software Publishing Corporation
(SPC) *Harvard Graphics v3.05*
Inset Systems *HiJaak Pro*
Lotus *Freelance v2.01*
Micrografx *Designer v4.0*
Corel *Ventura Publisher*

Standards
Tested:

MIL-STD-1840A
MIL-D-28000A
MIL-M-28001B
MIL-R-28002A
MIL-D-28003

3. 1840A Analysis

3.1 External Packaging

The tapes arrived at the Air Force CALS Test Bed (AFCTB) enclosed in a box in accordance with ASTM D 3951. The exterior of the box was marked with a magnetic tape warning label, as required by MIL-STD-1840A, para. 5.3.1.3.

The tapes were enclosed in a barrier bag as required by MIL-STD-1840A, para. 5.3.1.2. Inspection of the tape reels showed the label indicating the recording density, as required by MIL-STD-1840A, para. 5.3.1. Enclosed in the box was a packing list showing all files recorded on the tapes.

3.2 Transmission Envelope

The 9-track tapes received by the AFCTB contained MIL-STD-1840A files. The files were named per the standard conventions.

3.2.1 Tape Formats

The tapes were run through the AFCTN *Tapetool v1.2.10* utility. No errors were encountered while evaluating the contents of the tape labels.

The tapes were read using XSoft's *CAPS read1840A* utility without any reported errors. However, this utility process resulted in the loss of three of the four DTDs. This occurred because the four DTDs had identical destination system document (dstdocid) record values and the *CAPS read1840A* utility renames the files using the dstdocid record values. (MIL-STD-1840A permits identical dstdocid values for multiple files; MIL-STD-1840B corrected this problem).

The physical structure of the tapes meet the CALS MIL-STD-1840A requirements.

3.2.2 Declaration and Header Fields

No errors were reported in the Document Declaration file and data file headers. This portion of the tapes meet the CALS MIL-STD-1840A requirements.

4. IGES Analysis

The tapes contained 68 IGES files. These files were evaluated using IDA's *parser/verifier* set for CALS Class I. This utility reported all 68 files meet the specification defined in MIL-D-28000A. While no CALS errors were reported, all 68 files reported basic IGES errors and/or warnings. These deficiencies were line segments not jointed, or disjointed arcs. When viewed in a technical publication these areas were not apparent, however, when examined in detail they could be seen. In some cases these disjointed lines were thickened to hide the gaps and overlapping arcs.

The required conformance statement was found in the Start section of the files.

The AFCTB has several tools for viewing IGES files. These tools are not used to generate a pass/fail but to report how commercially available software can handle the files. Many of these products are used in the development of technical publications and are good indicators of usability. The use of these products is not an endorsement nor an indication of CALS capability. All operations were performed using the default settings.

Each file was viewed by at least one software application. Because of the number of files submitted on these tapes, only a sample of files, with noted problems, were selected for detailed analysis. Because file Q056 was noted with the most critical display errors it will be highlighted.

The most critical problem uncovered relates to files Q056, Q057, Q058, Q074 and Q075. These files displayed added lines used during the creation of the arrowheads. They were added after the leader lines. The arrowhead were created using the 230 entity, sectioned area. In file Q056 the area was displayed all over the image. The remaining files had these lines as well, but they were limited.

The most noticeable problem was the added arrowheads. Many of the leader lines had entities added to make the arrowheads. At the same time, the basic leader line was thickened, which made the arrowheads look different than the rest of the lines. Samples of these arrowheads are included in the Appendix of this report.

Files Q021, Q025, Q030, Q031, and Q045 had a misplaced line in the lower right corner of the screen, causing the main image to be displayed in the upper left corner.

File Q056 was converted using the AUTODESK *V5.1 IGES Translator*. When the file was displayed on the screen no problems were noted.

According to Edward Clapp of AUTODESK, "The IGES files contained several instances of IGES composite curve entities (entity type 102) which are not in conformance with the specification. The first sentence of Section 3.3 of IGES Version 4.0 reads, "A composite curve is a continuous curve that results from the grouping of certain individual constituent entities into a logical unit." There are several instances of this entity in these file which have disjoint full circles as their constituents. These composite curves are used as outer boundaries for expectation on the part of the sending systems that they will instead be used as separate curves whose interiors will be filled. it is a common and sensible practice on the part of receiving systems to fix up the composite curves by connecting the disjoint constituents. With the specific kind of misuse of the composite curve found in these files, these attempts result in unusable drawings on the receiving system, as can be seen in the output plots."

The log files from IDA's parser and ITI's *IGESWorks* for file D001Q056 are included in the Appendix of this report

The files were converted using ArborText's *iges2draw* utility with no reported errors. The resulting files were read into Island Software's *IslandDraw*, displayed and printed without a reported error. However, both the displayed and printed images were unusable.

File Q056 was translated using the Cadkey *ig2c* utility with no reported errors. The resulting file was read into Cadkey's *Cadkey*, displayed and printed. No problems were noted during this process.

The files were read using Carberry's *CADLeaf* software without a reported error. When displayed, the files with the noted sectioned area problems were visible. File Q056 displayed with a large sectioned area in the center of the image.

The files were read using IDA's *CALSView* without a reported error. When file Q056 was displayed, the sectioned area was in the center of the image. The lines between the arrowhead were filled.

The files were read using IDA's *IGESView* and *IGESView for Windows* without a reported error. The sectioned area displayed in file Q056. A detailed output, showing the sectioned area within an arrowhead, from file Q049 is included in the Appendix to this report.

The files were read using InterCAPS's *XChange*. File Q056 displayed correctly. The sectioned areas were suppressed and did not display.

The files were read using ITI's *IGESWorks v1.2* and *v2.0* without a reported error. When file Q056 was displayed, the sectioned areas were suppressed. It was noted that the arrowheads were not displayed or printed.

File Q056 was converted using Rosetta Technologies' *Prepare* with a reported error. Prepare did not support the sectioned area entity. The resulting file was read into Rosetta Technologies' *Preview*, displayed and printed.

While the IGES files meet the CALS MIL-D-28000A specification, several of the files did not display correctly. File Q056 had very noticeable sectioned areas when imported into some applications. The most critical application is the publishing system. Many files had the sectioned areas displayed. This is the result of adding arrowheads after the files were completed.

5. SGML Analysis

The tapes contained one text and four DTD files. The AFCTB has several parsers available for evaluating submitted DTD and text files. These tools are not used to generate a pass/fail but to report how commercially available software can handle the files. These products are used in the development of technical publications and are good indicators of usability. The use of these products is not an endorsement nor an indication of CALS capability. All operations were performed using the default settings unless specified in the report. Changes to DTD or text files required by each system are not documented in the report.

The text and DTD files were evaluated using the Exoterica *Validator exl* parser. One warning was issued for a mixed content model.

```
<!-- **Warning** in "i:\94047\BSPEC.DTD" (entity "%BSPEC"), line 1,
     used in "\xgml\9447.dtd", line 1:
   An element with mixed content should permit data characters ("#PCDATA")
   everywhere.
   The element being declared is "WARNING".
   <!ELEMENT warning   - - (title?, (%txt; | para | list)+) >
<!ATTLIST (warni
                                                       /\
-->
<!-- 1 warning reported. -->
```

The text and DTD files were tested using the Exoterica *XGMLNormalizer* parser. No errors or warnings were issued by this utility.

The text and DTD files were evaluated using McAfee & McAdam's *Sema Mark-it v2.3* parser. No errors or warnings were issued by this utility.

The text and DTD files were evaluated using the Public Domain *sgmls* parser. No errors or warnings were issued by this program.

The text and DTD files meet the CALS MIL-M-28001B specification.

6. Raster Analysis

The tapes contained seven Raster files. All files were evaluated using the AFCTN *validg4* utility. This program reported all seven files meet the CALS MIL-R-28002A specification.

The files were read into the AFCTN *xrastb.sun4* viewing utility. No problems were noted. All images with the exception of D001R077 were white lines/text on a black background. While not incorrect, it was hard to read some of the drawings. It was also noted that several of the images were electrical drawings. These files could have been inserted in the document using less memory if a CGM or IGES file had been used. As an example, file D001R080 decompressed into a file that was 1.3 megabytes.

The AFCTB has several tools for viewing Raster files. These tools are not used to generate a pass/fail but to report how commercially available software can handle the files. Many of these products are used in the development of technical publications and are good indicators of usability. The use of these products is not an endorsement nor an indication of CALS capability. All operations were performed using the default settings.

The files were converted using ArborText's *g42tiff* utility without a reported error. The resulting files were read into Island Software's *IslandPaint* and displayed.

The Raster files were read into Carberry's *CADLeaf* software and displayed without a reported error.

The files were read using IDA's *CALSView* and displayed without a reported error.

The files were read and displayed using IDA's *IGESView* and *IGESView for Windows*, without a reported error.

The files were read and displayed using Inset Systems' *HiJaak for Windows*, without a reported error.

The files were read and displayed using InterCAP's *X-Change*, without a reported error.

The Raster files were converted using Rosetta Technologies' *Prepare* without a reported error. The resulting files were read into Rosetta Technologies' *Preview* and displayed.

The Raster files were imported into Expert Graphics' *Rx-Highlight* and displayed without a reported error.

The Raster files meet the CALS MIL-R-28002A specification.

7. CGM Analysis

The tape contained two CGM files. The files were evaluated using ATC's *MetaCheck* with CALS options and were reported as meeting the CALS MIL-D-28003 specification.

The CGM files were evaluated using the beta AFCTN *validcgm* utility with no reported errors.

The AFCTB has several tools for viewing CGM files. These tools are not used to generate a pass/fail but to report how commercially available software can handle the files. Many of these products are used in the development of technical publications and are good indicators of usability. The use of these products is not an endorsement nor and indication of CALS capability. All operations were performed using the default settings.

The CGM files were converted using ArborText's *cgm2draw* utility without a reported error. The resulting files were read into Island Software's *IslandDraw v3.1*, displayed and printed. The font in file C001 exceeded the line length.

ATC's *ForReview* did not translate the background color correctly. The background color had to be changed to white in order to see the image. File C001 had a font translation problem.

The files were read into Carberry's *CADLeaf* software and displayed. File C001 had a font translation problem with the text being very small.

The files were read into IDA's *CALSView* with no noted problems. File C001 had a font translation problem.

The files were imported into the Micrografx *Designer* without a reported error.

The files were imported into Lotus' *Freelance* and displayed. File C001 had a font translation problem.

The files were imported into SPC's *Harvard Graphics v3.05* without a reported error. File C001 had a font translation problem.

The files were read into Inset Systems' *HiJaak Pro* without a reported error. File C001 had a font translation problem.

The files were imported directly into Island Software's *IslandDraw v4.0* without a reported error.

The files were read into InterCAP's *X-Change* without a reported error. File C001 had a font translation problem.

The files were imported into Corel's *Ventura Publisher* without a reported error.

The CGM files meet the CALS MIL-D-28003 specification. However, it was noted that most applications, available within the AFCTB, had problems translating the font in file C001 correctly.

8. Conclusions and Recommendations

The tape from O'Neil & Associates, Inc. was correct. The physical structure of the tape had no reported errors or warnings. The CALS headers were also correct. The tape meets the requirements defined in MIL-STD-1840A.

The IGES files had no reported CALS errors, and therefore, meet the CALS MIL-D-28000A specification. While no CALS errors were reported, five files (Q56, Q57, Q74, and Q75) had basic critical IGES errors. These files could not be used by some publication systems using their IGES translator. The construction of these files using entity 230 to define areas that are not closed caused problems. This is a serious misuse of the IGES entities.

The DTD and text files had no reported errors and meet the CALS MIL-M-28001B specification.

The Raster files meet the CALS MIL-R-28002A specification.

The tape submitted by O'Neil & Associates, Inc. meets the CALS MIL-STD-1840A requirements.

9. Appendix A - Tapetool Report Logs

9.1 Tape Catalog

CALS Test Network Catalog Evaluation - Version 1.2; Release 10 (C)

Standards referenced:
  MIL-STD-1840A (1987) - Automated Interchange of Technical Information
  ANSI X3.27 (1987) - File Structure and labeling of Magnetic Tapes
                      for Information Interchange
  ANSI X3.4 (1986) - Coded Character Sets - 7 Bit ASCII

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MIL-STD-1840A File Catalog

File Set Directory: /cals/u1210/Set071

Page: 1

File Name	File Type	Record Format/ Length	Block Length/Total	Selected/ Extracted
D001	Document Declaration	D/00260	02048/000001	Extracted
D001C001	CGM	F/00080	00800/000003	Extracted
D001C002	CGM	F/00080	00800/000003	Extracted
D001G003	DTD	D/00260	02048/000003	Extracted
D001G004	DTD	D/00260	02048/000013	Extracted
D001G005	DTD	D/00260	02048/000002	Extracted
D001G006	DTD	D/00260	02048/000003	Extracted
D001Q007	IGES	F/00080	02000/000360	Extracted

<<<<< PART OF LOG FILE REMOVED HERE >>>>>

D001Q075	IGES	F/00080	02000/000214	Extracted
D001R076	Raster	F/00128	02048/000023	Extracted
D001R077	Raster	F/00128	02048/000024	Extracted
D001R078	Raster	F/00128	02048/000029	Extracted
D001R079	Raster	F/00128	02048/000019	Extracted
D001R080	Raster	F/00128	02048/000021	Extracted
D001R081	Raster	F/00128	02048/000018	Extracted
D001R082	Raster	F/00128	02048/000014	Extracted
D001T083	Text	D/00260	02048/000167	Extracted

Catalog Process terminated normally.

9.2 Tape Evaluation Log

```
CALS Test Network Tape Evaluation - Version 1.2; Release 10 (C)
  Standards referenced:
     ANSI X3.27 (1987) - File Structure and labeling of Magnetic Tapes
                          for Information Interchange
     ANSI X3.4 (1986) - Coded Character Sets - 7 Bit ASCII

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ANSI Tape Import Log
Allocating tape drive /dev/rmt0...


/dev/rmt0 allocated.


VOL1ONA001                                                              4

  Label Identifier: VOL1
  Volume Identifier: ONA001
  Volume Accessibility:
  Owner Identifier:
  Label Standard Version: 4


HDR1D001                  ONA00100010001000000 94139 00000 000000

  Label Identifier: HDR1
  File Identifier: D001
  File Set Identifier: ONA001
  File Section Number: 0001
  File Sequence Number: 0001
  Generation Number: 0000
  Generation Version Number: 00
  Creation Date:  94139
  Expiration Date:  00000
  File Accessibility:
  Block Count: 000000
  Implementation Identifier:

                    <<<<< PART OF LOG FILE REMOVED HERE >>>>>

############ End of Volume ONA002 #############

############ End Of Tape File Set #############

Deallocating /dev/rmt0...

Tape Import Process terminated normally.
```

9.3 Tape File Set Validation Log

CALS Test Network File Set Evaluation - Version 1.2; Release 10 (C)

  Standards referenced:
    MIL-STD-1840A (1987) - Automated Interchange of Technical Information

Tue May 24 09:53:37 1994

MIL-STD-1840A File Set Evaluation Log

File Set: Set071

Found file: D001
Extracting Document Declaration Header Records...
Evaluating Document Declaration Header Records...

srcsys: O'Neil & Assoc. CAGE 83007
srcdocid: TO 31R2-2T-12
srcrelid: NONE
chglvl: ORIGINAL
dteisu: 19940503
dstsys: RAYTHEON CAGE 49956
dstdocid: TO 31R2-2T-12
dstrelid: NONE
dtetrn: 19940519
dlvacc: NONE
filcnt: C2,G4,Q69,R7,T1
ttlcls: UNCLASSIFIED
doccls: UNCLASSIFIED
doctyp: Technical Publication
docttl: NONE

Found file: D001C001
Extracting CGM Header Records...
Evaluating CGM Header Records...

srcdocid: TO 31R2-2T-12
dstdocid: TO 31R2-2T-12
txtfilid: W
figid: INTRO-CAUTION-ESD
srcgph: ESDCAU
doccls: UNCLASSIFIED
notes: NONE

Saving CGM Header File: D001C001_HDR
Saving CGM Data File: D001C001_CGM

Found file: D001C002
Extracting CGM Header Records...
Evaluating CGM Header Records...

srcdocid: TO 31R2-2T-12
dstdocid: TO 31R2-2T-12
txtfilid: W
figid: ESD symbol used in CAUTIONs in maintenance procedures.
srcgph: TXTRESD
doccls: UNCLASSIFIED
notes: NONE

Saving CGM Header File: D001C002_HDR
Saving CGM Data File: D001C002_CGM

Found file: D001G003
Extracting DTD Header Records...
Evaluating DTD Header Records...

srcdocid: TO 31R2-2T-12
dstdocid: TO 31R2-2T-12
notes: DTD, 1 of 4

Saving DTD Header File: D001G003_HDR
Saving DTD Data File: D001G003_DTD

Found file: D001G004
Extracting DTD Header Records...
Evaluating DTD Header Records...

srcdocid: TO 31R2-2T-12
dstdocid: TO 31R2-2T-12
notes: DTD, 2 of 4

Saving DTD Header File: D001G004_HDR
Saving DTD Data File: D001G004_DTD

Found file: D001G005
Extracting DTD Header Records...
Evaluating DTD Header Records...

srcdocid: TO 31R2-2T-12
dstdocid: TO 31R2-2T-12
notes: DTD, 3 of 4

Saving DTD Header File: D001G005_HDR
Saving DTD Data File: D001G005_DTD

Found file: D001G006
Extracting DTD Header Records...
Evaluating DTD Header Records...

srcdocid: TO 31R2-2T-12
dstdocid: TO 31R2-2T-12
notes: DTD, 4 of 4

Saving DTD Header File: D001G006_HDR
Saving DTD Data File: D001G006_DTD

Found file: D001Q007
Extracting IGES Header Records...
Evaluating IGES Header Records...

srcdocid: TO 31R2-2T-12
dstdocid: TO 31R2-2T-12
txtfilid: W
figid: 1-1
srcgph: MCB12
doccls: UNCLASSIFIED
notes: NONE

Saving IGES Header File: D001Q007_HDR
Saving IGES Data File: D001Q007_IGS

<<<<< *PART OF LOG FILE REMOVED HERE* >>>>>

Found file: D001R082
Extracting Raster Header Records...
Evaluating Raster Header Records...

srcdocid: TO 31R2-2T-12
dstdocid: TO 31R2-2T-12
txtfilid: W
figid: FO-15 3 OF 3
srcgph: T43343
doccls: UNCLASSIFIED
rtype: 1
rorient: 000,270
rpelcnt: 004263,001696
rdensty: 0300
notes: NONE

Saving Raster Header File: D001R082_HDR
Saving Raster Data File: D001R082_GR4

Found file: D001T083
Extracting Text Header Records...
Evaluating Text Header Records...

srcdocid: TO 31R2-2T-12
dstdocid: TO 31R2-2T-12
txtfilid: W
doccls: UNCLASSIFIED
notes: NONE

Saving Text Header File: D001T083_HDR
Saving Text Data File: D001T083_TXT

Evaluating numbering scheme...
No errors were encountered during numbering scheme evaluation.
Numbering scheme evaluation complete.

Checking file count...
No errors were encountered during file count verification.
File Count verification complete.

No errors were encountered in Document D001.

No errors were encountered in this File Set.

MIL-STD-1840A File Set Evaluation Complete.

10. Appendix B - Detailed IGES Analysis

10.1 File D001Q056

10.1.1 Parser/Verifier Log

```
************************************
*****   IGES PARSER/VERIFIER   *****
*****       MARCH 1993        *****
*****    IGES Data Analysis    *****
*****     (708) 344-1815       *****
************************************


Input file is q056.igs
Checking conformance to CALS Class I (MIL-D-28000A 2/10/92)

Today is May 31, 1994  9:27 AM


************************************
*****    CHECK FILE SYNTAX     *****
************************************


    Section        Records

    Start            5
    Global           3
    Directory      3284   (   1642 Entities)
    Parameter      2481
    Terminate        1


    No syntax errors detected.


************************************
*****  SUMMARY AND STATISTICS   ****
************************************


*** File and Product Name Information ***

    File name from sender    = 'T12.21.dwg'
    File creation Date.Time   = '940316.144154'
    Model change Date.Time    = ''
    Author                    = 'Brian Keefe'
    Department                = ''
    Product name from sender  = 'Xerox Expert'
    Destination product name  = ''
```

*** Parameter Delimiters ***

    Delimiter = ','
    Terminator = ';'

*** Originating System Data ***

    System ID   = 'Xerox Expert version 5.0'
    Preprocessor version   = '5.0'
    Specification version = 6 (IGES 4.0)

*** Precision levels ***
    Integer bits =   16
    Floating point - Exponent =   38 Mantissa =   7
    Double precision - Exponent =   38 Mantissa =   7

*** Global Model Data ***

    Model scale   = 1.0000E+00
    Unit flag   = 1
    Units   = 'INCH'
    Line weights   = 3
    Maximum line thickness = 4.166667E-02
    Minimum line thickness = 1.388889E-02
    Granularity   = 1.000000E-05
    Maximum coordinate   = 1.921000E+01

    Drafting standard applicable to original data is not specified.

*** Status Flag Summary ***

    Blank status: Visible   1642
                  Blanked   0

    Independence: Independent   1432
                  Physically Subordinate   208
                  Logically Subordinate   2
                  Totally Subordinate   0

    Entity use: Geometry   1121
                  Annotation   518
                  Definition   2
                  Other   1
                  Logical/Positional   0
                  2D parametric   0
                  Construction geometry   0
                  Not Specified   0

Hierarchy: Structure DE applies   1642
                Subordinate DE applies   0
                Hierarchy property applies   0
                Not Specified   0

*** Entity Occurrence Counts ***

Entity	Form	Level	Count	Type
100	0	0	313	Circular arc
102	0	0	17	Composite curve
110	0	0	774	Line
212	0	0	518	General note
230	0	0	17	Sectioned area (Standard Crosshatching)
404	0	0	1	Drawing
406	16	0	1	Property - Drawing size
410	0	0	1	View - Orthographic parallel

*** Entity Count by Level ***

Level	Count
0	1642

*** Labeling Information ***

100% of the entities are labeled.

    Unlabeled   0

Label	Count	Label	Count	Label	Count
View	1*	GNote	518*	Line	774*
Arc	27*	Circle	286*	Composit	17
Section	17*	Property	1	Drawing	1*

NITPICK 2327: One or more of the flagged entity labels are not right-justified.

*** Line Fonts Used in Data ***

100	102	104	106	108	110	112	114	
-	-	-	-	-	-	-	-	Undefined
313	17	-	-	-	770	-	-	Solid
-	-	-	-	-	4	-	-	Dashed
-	-	-	-	-	-	-	-	Phantom
-	-	-	-	-	-	-	-	Center-line

<<<<< PART OF LOG FILE REMOVED HERE >>>>>

*** Line Widths Used in Data ***

Weight	Count	Width
Defaulted	1087	(0.0139)
1	555	(0.0139)

*** Colors Used in Data ***

Defaulted	37
Green	1605

```
************************************
*****      ENTITY ANALYSIS      *****
************************************
```

*** Entity type: 100

*** Entity type: 102

ERROR   2033: End points of curves D   2823 and D   2825 disjoint by
              7.777690E-02 at D   2829.
ERROR   2033: End points of curves D   2833 and D   2835 disjoint by
              7.777862E-02 at D   2839.
NOTE   2391: Start point D   2843 and D   2845 are the same, possible reversal
              of D   2845.
NOTE   2391: Start point D   2855 and D   2857 are the same, possible reversal
              of D   2857.
ERROR   2033: Messages regarding disjoint composite curves suppressed.
NOTE   2391: Start point D   2933 and D   2935 are the same, possible reversal
              of D   2935.

*** Entity type: 110

--   774 lines averaging 6.316905E-01 units --

*** Entity type: 212

      518 text strings in data file.
      Average text aspect ratio in file is 0.9039340.
      Minimum text aspect ratio in file is 0.9002263.
      Maximum text aspect ratio in file is 0.9047646.

FONTS USED IN FILE

FONT   COUNT   NAME

1   518   Default ASCII Style

*** Entity type: 230

NITPICK 2076: Entity does not have Annotation flag set at D   2831.
NITPICK 2076: Entity does not have Annotation flag set at D   2841.
NITPICK 2076: Messages regarding entity use (annotation) suppressed.

*** Entity type: 404

NITPICK 2074: Entity use flag must be 1 for Drawing entity at D   3283.
Drawing at D   3283 contains 1 views.
Drawing at D   3283 contains 0 annotation entities.

*** Entity type: 406

*** Entity type: 410

NITPICK 2073: Entity use flag must be 1 for View entity at D   1.
   Scale of view at D   1 is 1.000000E+00.
Orthographic View entity at D   1 has 0 clipping planes specified.
    XMIN = Not Set   XMAX = Not Set
    YMIN = Not Set   YMAX = Not Set
    ZMIN = Not Set   ZMAX = Not Set

*** Message Summary ***

2007: 160 Mathematical discontinuities.
2016: 19 Invalid entity use flag.

*** Error Summary ***

    0 fatal errors
    0 severe errors
  160 errors
    0 warnings
    0 cautions
   20 nitpicks
    5 notes

*** End of Analysis of q056.igs ***

10.1.2 Translator Log - AutoCAD

```
Title: IGESIN Journal (v5.1 Nov 05 1992)
=======================================================================
File: C:/TMP/Q056.xli
Date: Tue, May 31, 1994
Time: 10:00:21
=======================================================================


EVALUATION VERSION -- NOT FOR RESALE


Translator S/N:   117-10075750
Translating from IGES file:        C:/TMP/Q056.IGS
          to AutoCAD Drawing:      C:\Q056.dwg


=======================================================================
Options obtained from:  default settings
Curves Approximated to Tolerance of            0.01
Surfaces Approximated to Tolerance of          0.01


Text Font/Style mapping:
IGES Text font       Style Name       ACAD Font
         0            SYMBOL0           iges0
         1            STANDARD           txt
         2              LEROY            txt
         3             FUTURA            txt
         6             COMP80            txt
        12            GOTHICE          gothice
        13            GOTHICI          gothici
        14            ROMANS           romans
        17            ROMANT           romant
        18            ROMAND           romand
        19               OCR             txt
      1001            SYMBOL1          iges1001
      1002            SYMBOL2          iges1002
      1003            SYMBOL3          iges1003
      2001             KANJI           bigfont

IGES Linefont/AutoCAD Linetype mapping
IGES Line Font       AutoCAD linetype       Shape file
         0               BYLAYER
         1             CONTINUOUS
         2               DASHED             acad.lin
         3               PHANTOM            acad.lin
         4               CENTER             acad.lin
         5                DOT               acad.lin
=======================================================================
```

Parse phase

*** Warning (IAFP__LARGER_SGL_SIG) ***
C:/TMP/Q056.IGS, line 8: IGES file has greater number of significant digits in single precision numbers than this system.

*** Warning (IEVM_LABEL_NOT_RJ) ***
(DE 1, TF 410:0) DE has an invalid label justification.

Action taken: Label has been right justified.

<<<<< *PART OF LOG FILE REMOVED HERE* >>>>>

*** Warning (IEVM_RADII_NOT_EQUAL_100) ***
(DE 33, TF 100:0) Entity's radii are not equal. Start point radius: 1.3703656e-001. Terminate point radius: 1.3703320e-001.

Action taken: Start point moved 1.6771277e-006 units from 1.3357910e+001, 9.7922850e+000 to 1.3357909e+001, 9.7922834e+000. Terminate point moved 1.6771277e-006 units from 1.3265980e+001, 9.7922850e+000 to 1.3265979e+001, 9.7922866e+000.

<<<<< *PART OF LOG FILE REMOVED HERE* >>>>>

=== =
Start Section:

Drawing name: T12.21.DWG. This file was converted by Expert.
Compliant with CALS class 1, per MIL-D-28000 Amendment 1.

DATE: 16-Mar-94 14:41:54

Global Section:

Parameter Delimiter:	,
Record Delimiter:	;
Sending Product ID:	Xerox Expert
File Name:	T12.21.dwg
System ID:	Xerox Expert version 5.0
Preprocessor Version:	5.0
Size of Integer:	16
Sgl. Precision Mag:	38
Sgl. Precision Sig:	7
Dbl. Precision Mag:	38
Dbl. Precision Sig:	7
Receiving Product ID:	
Model Space Scale:	1.000000
Unit Flag:	1

Unit String: INCH
# of Line Weights: 3
Maximum Line Width: 0.041667
Creation Date: 03/16/94 14:41:54
Minimum Resolution: 0.000010
Maximum Coordinate: 19.210000
Author: Brian Keefe
Organization:
IGES Version Number: 6
Drafting Standard: 0

Entity Summary:

Type	Form	Description	Count
100	0	Circular Arc	313
102	0	Composite Curve	17
110	0	Line	774
212	0	General Note (Simple)	518
230	0	Section Area (Standard Fill)	17
404	0	Drawing (form 0)	1
406	16	Property (Drawing Size)	1
410	0	View	1
		Total	1642

Translation phase

*** Warning (IGEO_DISCONTINUOUS) ***
(DE: 2849 TF: 102:0 NAME: Composite Curve)
The IGES entity is discontinuous between segment 1 and 2.
A linear segment will be added at the discontinuity for approximation.

<<<<< *PART OF LOG FILE REMOVED HERE* >>>>>

*** Error (IGEO_SECTAREANOTCLOSED) ***
(DE: 2851 TF: 230:0 NAME: Section Area (Standard Fill))
The section area is not closed.

<<<<< *PART OF LOG FILE REMOVED HERE* >>>>>

*** Error (ACAD_APPROXCURVEERROR) ***
Internal error 2302 approximating curve at DE: 2941, TYPE: 230, FORM: 0

<<<<< *PART OF LOG FILE REMOVED HERE* >>>>>

*** Error (IGEO_SECTAREANOTCLOSED) ***
(DE: 3261 TF: 230:0 NAME: Section Area (Standard Fill))
The section area is not closed.

Drawing Entity (404 Form 0) at DE 3283, with
   name = ,
   size = 19.210000, 12.430000,
   units = IN,
was processed in the AutoCAD drawing file: C:\Q056.dwg

*** Warning (ACAD_NEW_VIEW_VOLUME_GENERATED) ***
(DE: 1 TF: 410:0)
A new view volume has been generated for the view with:
 XMIN (-2.288073), XMAX (21.498075),
 YMIN (-2.288119), YMAX (14.718025),
 ZMIN (-2.288075), ZMAX (2.288075).

IGES Entity Summary

Type	Form	Description	Count	Processed	Errors
100	0	Circular Arc	456	456	0
102	0	Composite Curve	20	20	0
110	0	Line	726	726	0
212	0	General Note (Simple)	518	518	0
230	0	Section Area (Standard Fill)	17	17	0
404	0	Drawing (form 0)	1	1	0
406	16	Property (Drawing Size)	1	1	0
410	0	View	1	1	0
Totals			1740	1740	0

AutoCAD Entity Summary

Entity	Created	Errors
LINE	726	0
CIRCLE	429	0
TEXT	518	0
ARC	27	0
SOLID	14	0
INSERT	4	0
POLYLINE	2	0
BLOCK	5	0
Totals	1725	0

Error Summary:

The following message was issued 1 time(s)
IGES file has greater number of significant digits in single precision numbers
than this system.

The following message was issued 1624 time(s)
DE has an invalid label justification.

The following message was issued 18 time(s)
Entity's radii are not equal. Start point radius: %.7e. Terminate point
radius: %.7e.

The following message was issued 2 time(s)
The section area is not closed.

The following message was issued 146 time(s)
The IGES entity is discontinuous between segment %d and %d.
A linear segment will be added at the discontinuity for approximation.

The following message was issued 1 time(s)
Internal error %d approximating curve at DE: %d, TYPE: %d, FORM: %d

The following message was issued 1 time(s)
A new view volume has been generated for the view with:
 XMIN (%lf), XMAX (%lf),
 YMIN (%lf), YMAX (%lf),
 ZMIN (%lf), ZMAX (%lf).

Status: 0
Warning: 1790
Error: 3
Fatal: 0

Elapsed Time:

Processor: 00:00:44
Clock: 00:00:45
===

10.1.3 Parser Log - IGESWorks

IGES/Works v1.4.1
International TechneGroup Incorporated
Validation Logfile

Date: May 30, 1994
Model: q056
******************** Validation Parameters ********************
TOLERANCE CONFIGURATION VALUES

ZERO_TOL	$= 1.000000e-13$
MODEL_SPACE_PNT_COIN_TOL	$= 1.000000e-03$
PARM_SPACE_PNT_COIN_TOL	$= 1.000000e-08$
ISO_PARM_CURVE_TOL	$= 1.000000e-08$
NON_CONV_TOL	$= 1.000000e-12$
KNOT_COIN_TOL	$= 1.000000e-10$
SAME_INTER_TOL	$= 1.000000e-12$
PARALLEL_LINES_TOL	$= 1.000000e-07$
ANGLE_COIN_TOL	$= 1.000000e-05$
PNT_PROJ_TOL	$= 1.000000e-07$
COLIN_TOL	$= 1.000000e-07$
COPLANAR_TOL	$= 1.000000e-08$
ZERO_NORMAL_TOL	$= 1.000000e-06$
SAME_TANGENT_TOL	$= 1.000000e-04$
SAME_CURVATURE_TOL	$= 1.000000e-04$
SAME_DERIVATIVE_TOL	$= 1.000000e-03$
MODEL_LINEAR_APPROX_TOL	$= 2.220446e-16$

************** Entity Listing Before Validation **************

Count	Type	Form	Description
313	100	0	Circular Arc
17	102	0	Composite Curve
774	110	0	Line
518	212	0	General Note (Simple)
17	230	0	Section Area (Standard Fill)
1	404	0	Drawing (form 0)
1	406	16	Property (Drawing Size)
1	410	0	View

1642 - Number of entities in selection list

******************** Entity Validation ********************

*** Warning (IEVM_LABEL_NOT_RJ) ***
(DE 1, TF 410:0) The Label Display field in this entity's DE section was
not set for right justification.
Action taken: The Label Display field has been set to be right-justified.

<<<<< *PART OF LOG FILE REMOVED HERE* >>>>>

*** Warning (IEVM_NON_CONTINUOUS_102) ***
(DE 2829, TF 102:0) This Composite Curve entity (102) is not continuous
within the stated tolerance. The terminate point of the first curve does
not equal the start point of the next curve.
Action taken: The curve was made continuous by the following actions.
DE 2823 was reversed.

<<<<< *PART OF LOG FILE REMOVED HERE* >>>>>

Entity Validation Summary:

Type	Form	Entity Count	Number Valid	Number of Corrected		Number of Uncorrected	
				Warnings	Errors	Warnings	Errors
Global Section		1	1	0	0	0	0
100	0	313	0	313	0	0	0
102	0	17	0	0	17	0	0
110	0	916	142	774	0	0	0
212	0	518	0	518	0	0	0
230	0	17	0	17	0	0	0
404	0	1	0	1	0	0	0
406	16	1	1	0	0	0	0
410	0	1	0	1	0	0	0
Totals:		1785	144	1624	17	0	0

The following message was issued and suppressed 1619 times:
   The Label Display field in this entity's DE section was not set for
   right justification.

The following message was issued and suppressed 12 times:
   This Composite Curve entity (102) is not continuous within the stated
   tolerance. The terminate point of the first curve does not equal the
   start point of the next curve.

A message is suppressed when it has been issued more than 5 times. This
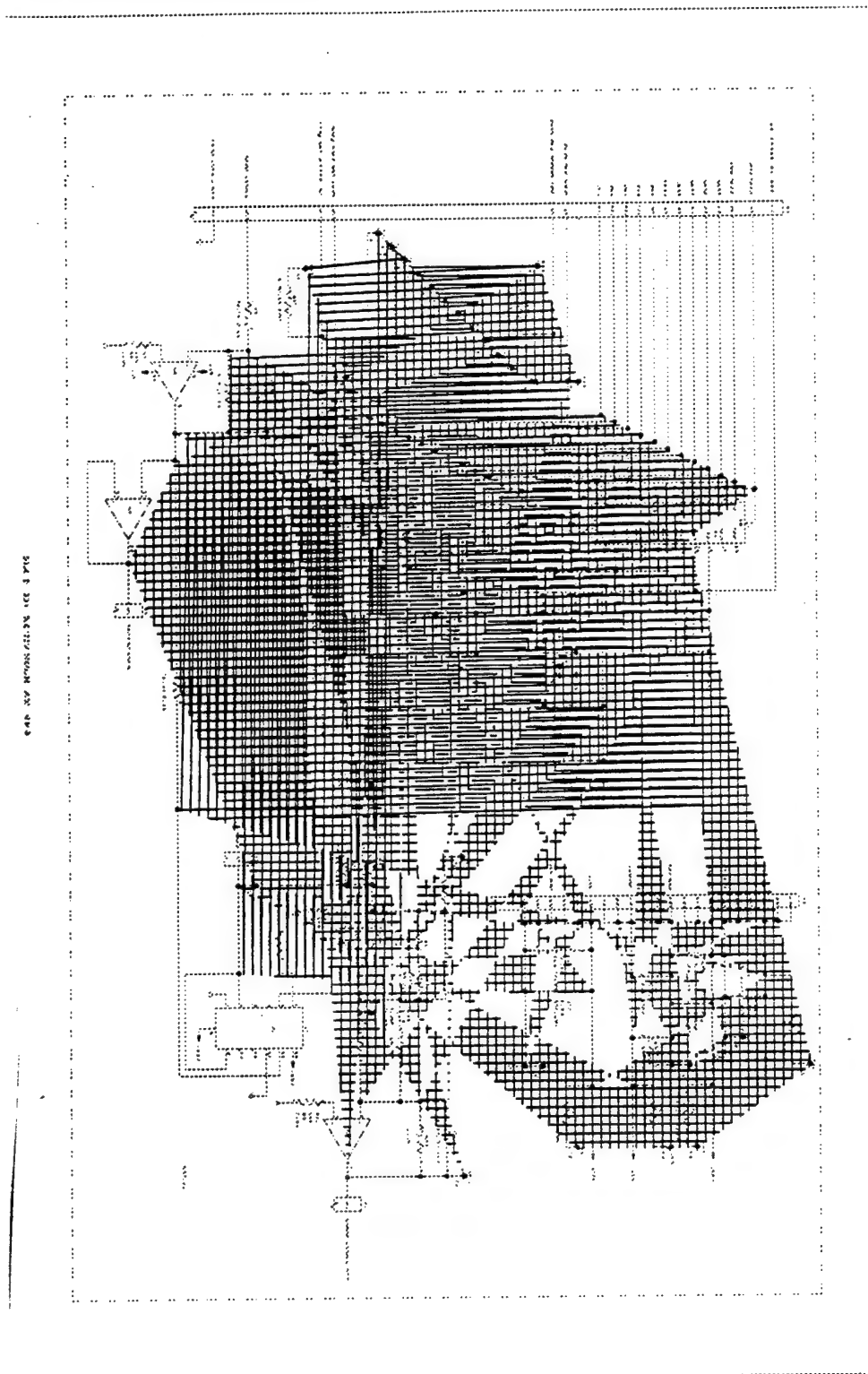value is controlled by the 'MAX_MESSAGE' configuration parameter.
****

10.1.4 Output AutoCAD R12

10.1.5 Output Cadkey V6.0
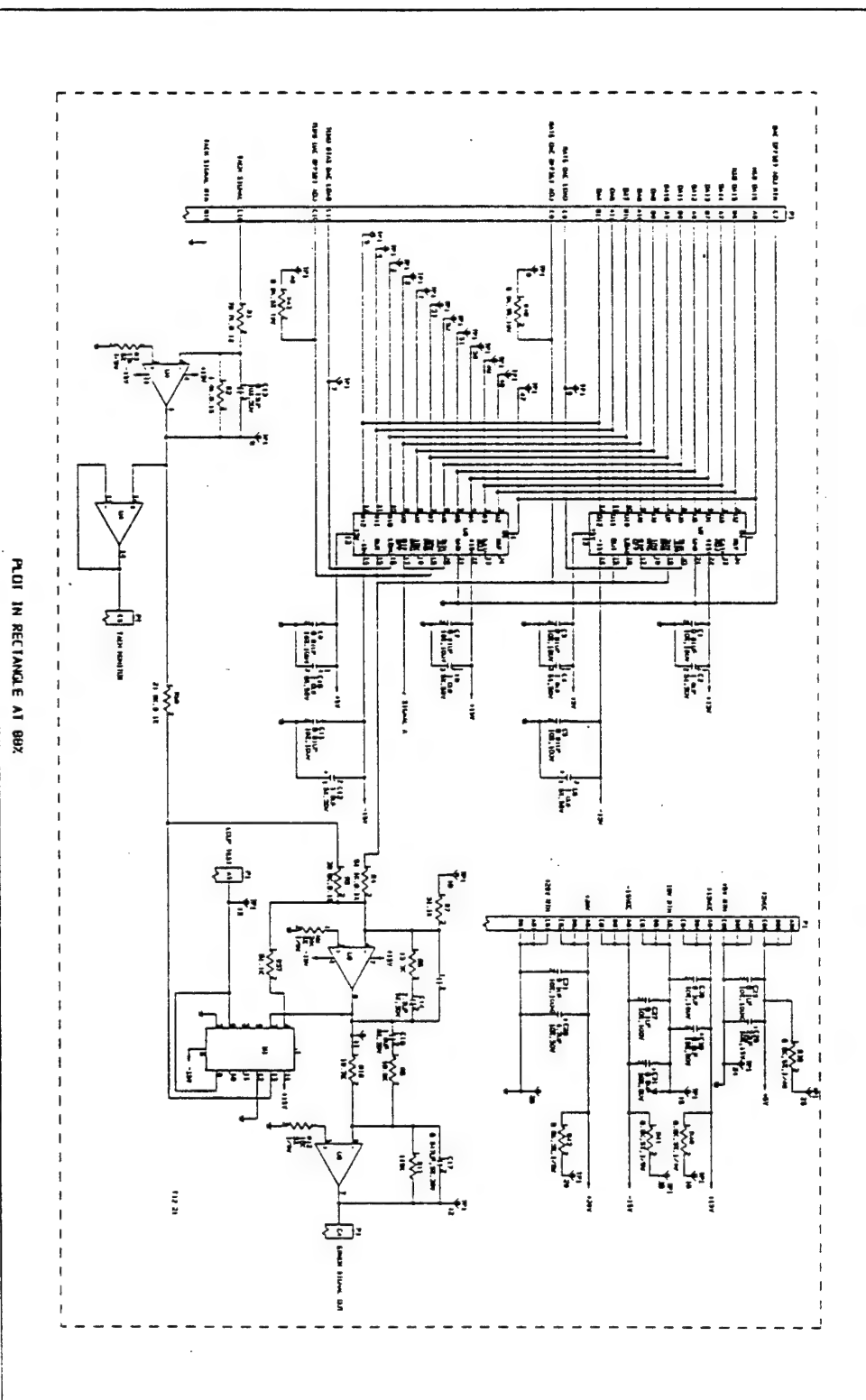
10.1.6   Output AutoSurf v6
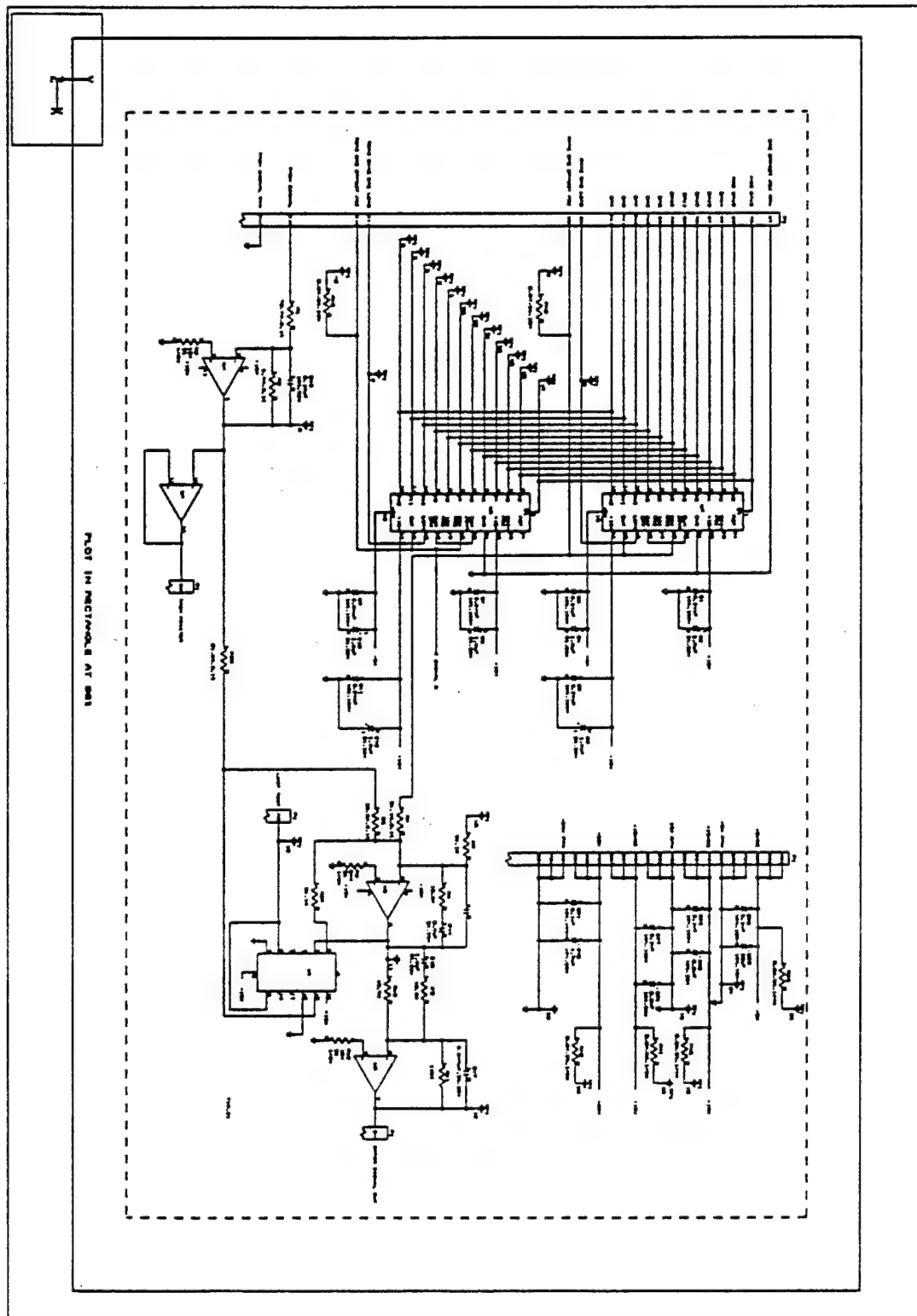
10.1.7 Output CADLeaf

10.1.8 Output IGESView

10.1.9 Output iges2draw/IslandDraw
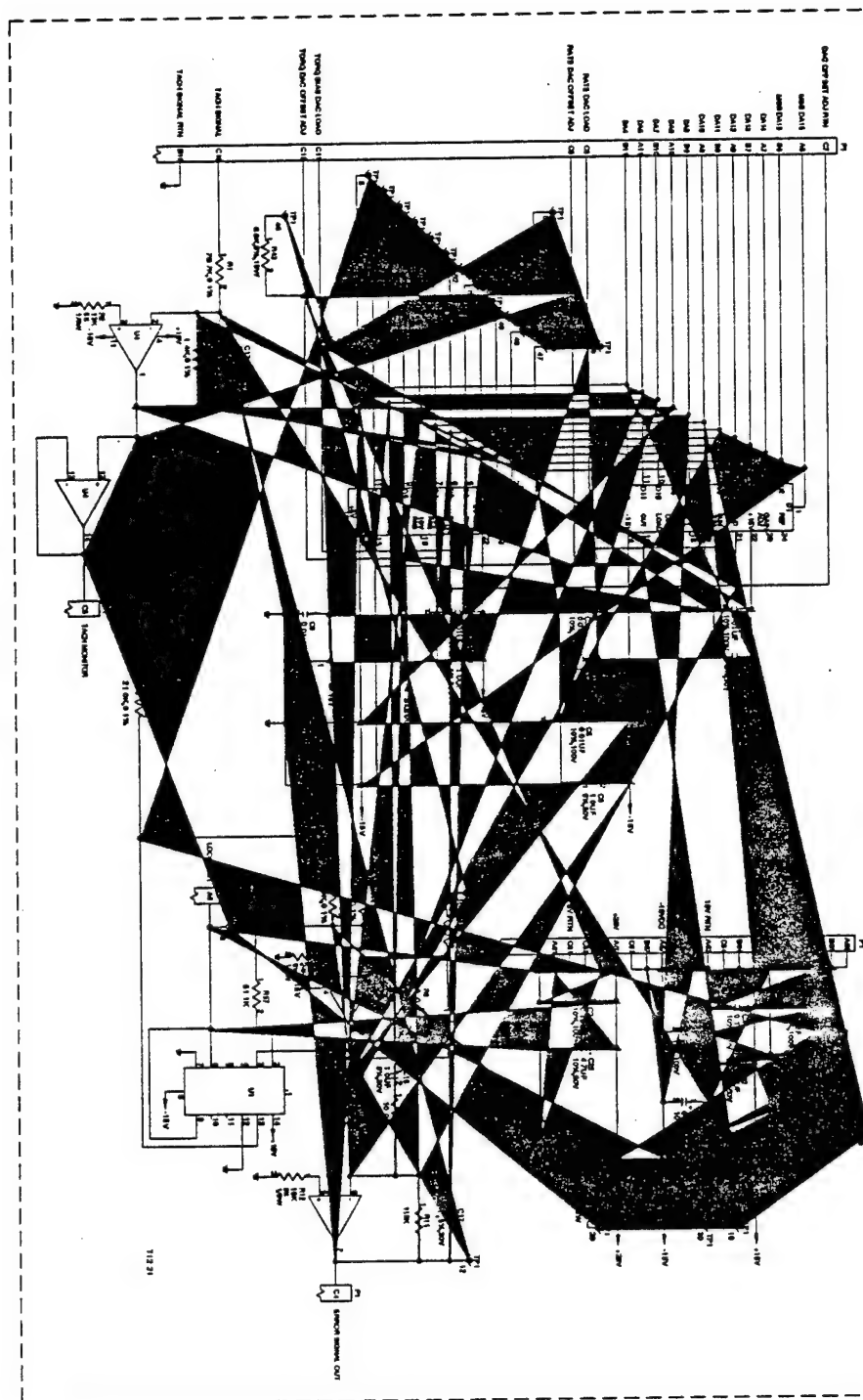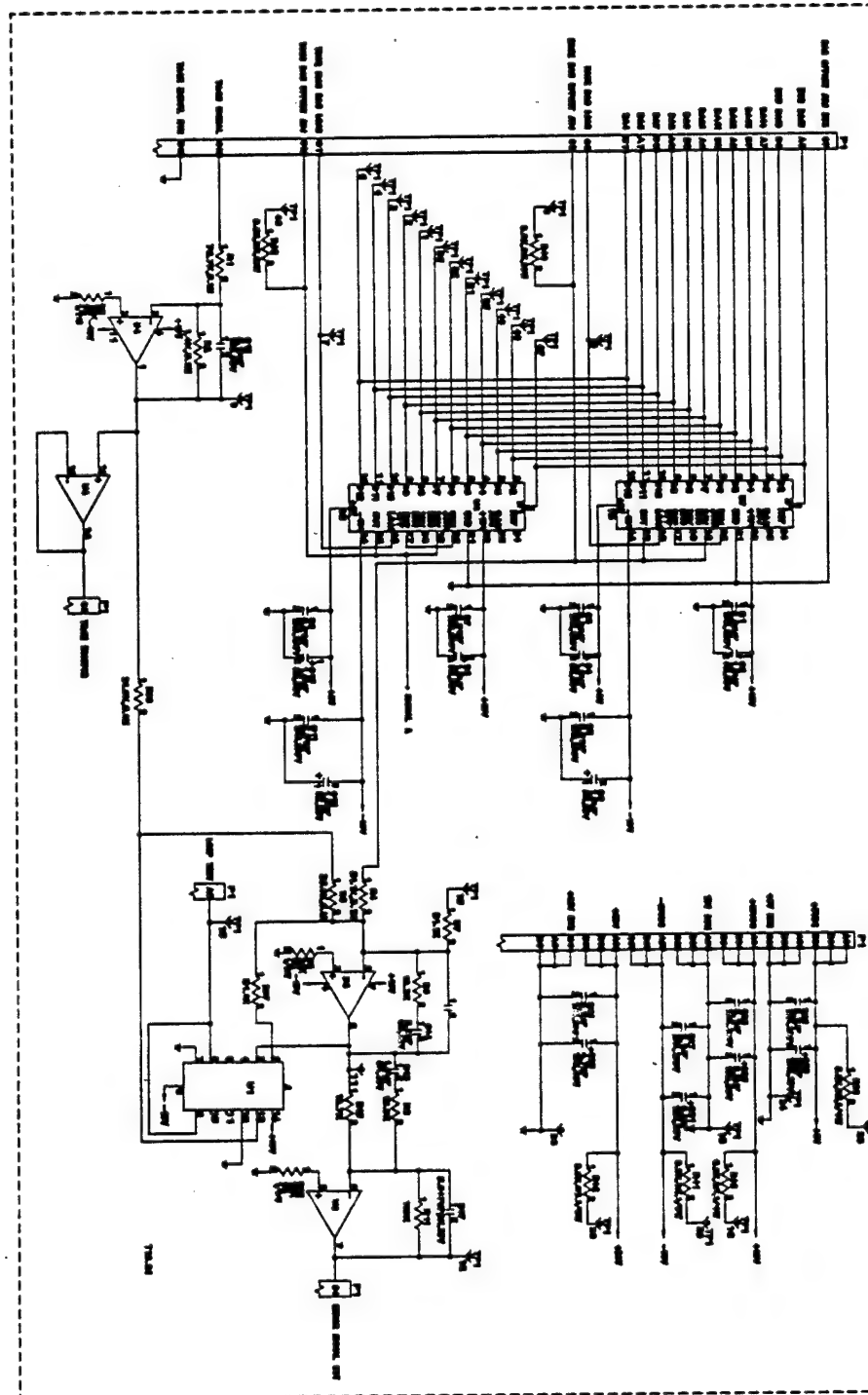
10.1.10 Output IGESWorks
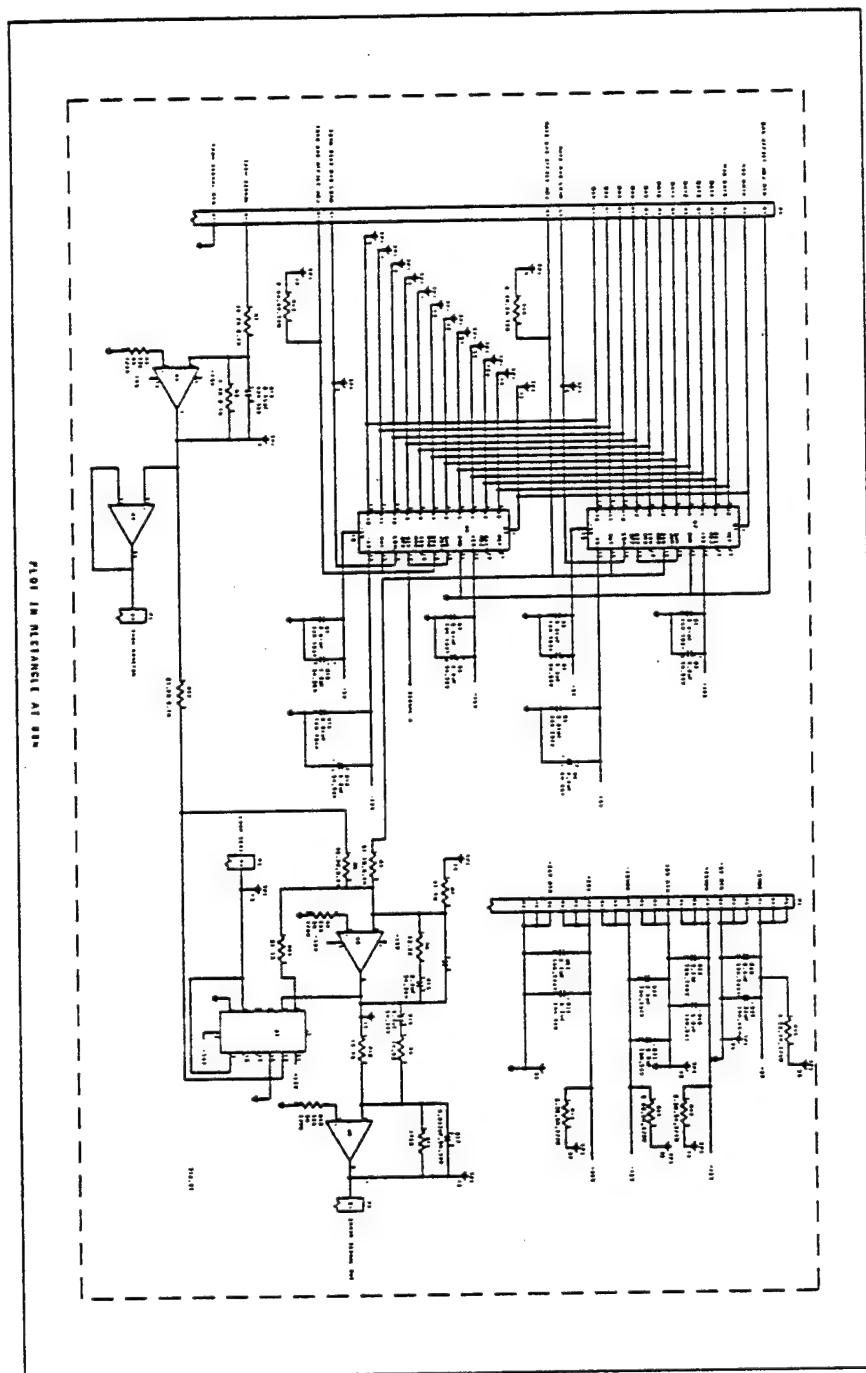
10.1.11   Output X-Change

10.1.12 Output Preview
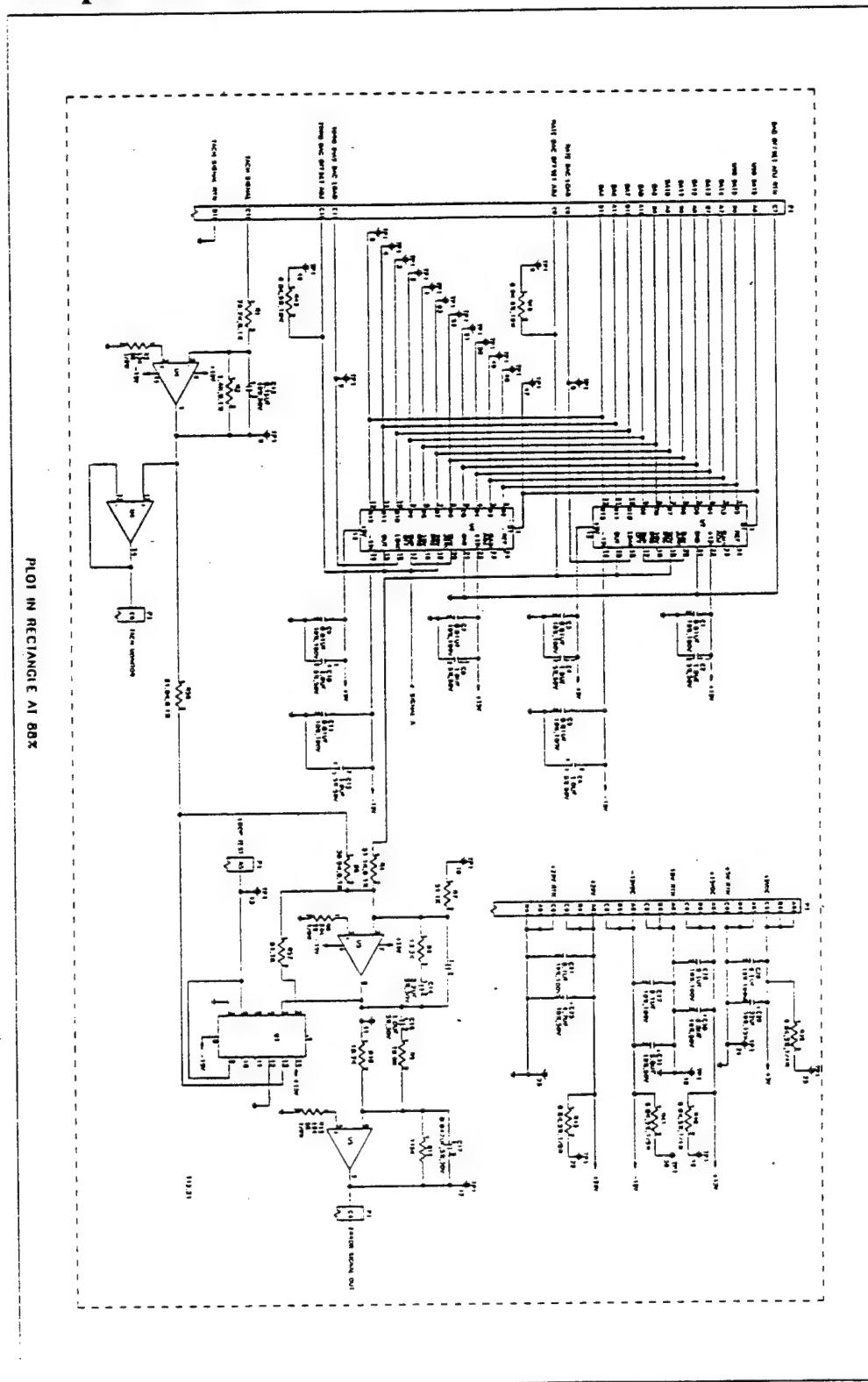
10.1.13   Output D001Q049 - Arrowhead Detail

AZ/EL BRAKE
ENABLE

CONTROL
LINES
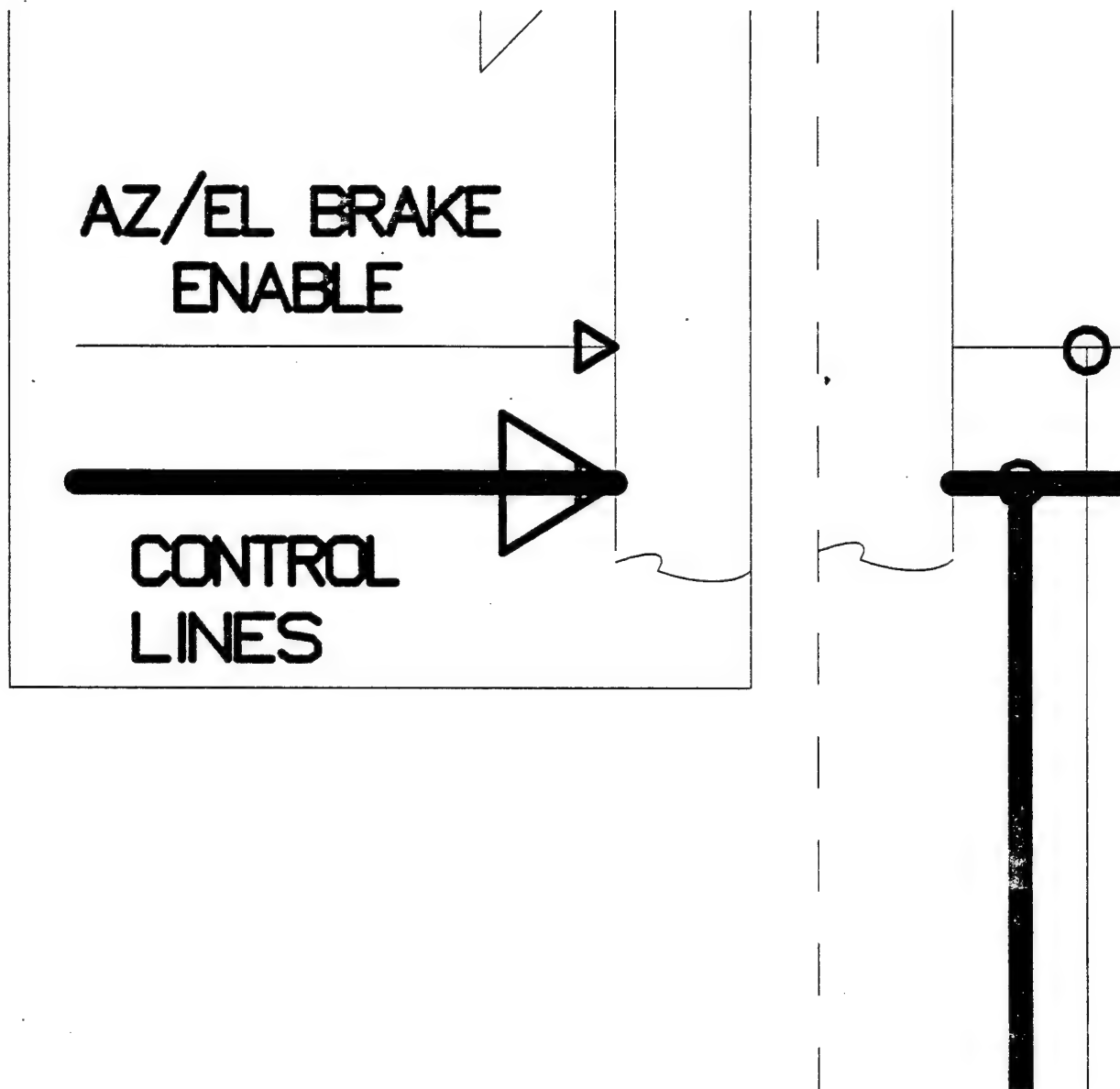
11. Appendix C - Detailed Raster Analysis

11.1 File D001R076

11.1.1 Output IGESView

11.2 File D001R077

11.2.1 Output IGESView

HOW TO USE THE ILLUSTRATED PARTS BREAKDOWN

WHEN THE PART NUMBER OR REFERENCE DESIGNATION IS KNOWN

1. When the part number is known, locate the part number in the Numerical Index. Note the assigned figure and index number.

2. For information regarding the part, refer to the MPL legend associated with the figure and index number.

3. For a pictorial representation of the part, refer to the associated figure and locate the index number.

4. When the reference designator is known, locate it in a MPL description column. Note the assigned part number, then refer back to step 1.

12. Appendix D - Detailed CGM Analysis

12.1 File C001

12.1.1 Parser Log MetaCheck

```
MetaCheck Version 2.10 -- CGM/MIL-D-28003 Conformance Analyzer
Copyright 1988-93 CGM Technology Software
Execution Date: 05/30/94     Time:  11:43:36

Metafile Examined     : i:\94064\c001.cgm

Pictures Examined     : All
Elements Examined     : All
Bytes     Examined     : All

======================= Trace Report ========================

Tracing not selected.

============= CGM Conformance Violation Report ==============

No Errors Detected

========== CALS CGM Profile (MIL-D-28003) Report ============

No profile discrepancies detected.

================ Conformance Summary Report =================

MetaCheck Version 2.10 -- CGM/MIL-D-28003 Conformance Analyzer
Copyright 1988-93 CGM Technology Software
Execution Date: 05/30/94     Time:  11:43:38

Name of CGM under test: i:\94064\c001.cgm
Encoding               : Binary

Pictures Examined     : All
Elements Examined     : All
Bytes     Examined     : All

BEGIN METAFILE string : >esdcau<
METAFILE DESCRIPTION   : >AUTO-TROL/REL-1.0 MIL-D-28003/BASIC-<
                         >1<
```

Picture 1 starts at octet offset 124: >esdcau<

Conformance Summary : This file conforms to the CGM specification.
                        This file meets the CALS CGM Profile (MIL-D-28003).

Summary of Testing Performed and Errors Found:

         1 Pictures Tested
        97 Elements Tested
      1528 Octets Tested

            ===================================
            | No Errors Were Detected |
            ===================================

================= End of Conformance Report ==================

12.1.2 validcgm Log

Analysis for file c001.cgm using table table
(0, 1) occurred 1 time
(0, 2) occurred 1 time
(0, 3) occurred 1 time
(0, 4) occurred 1 time
(0, 5) occurred 1 time
(1, 1) occurred 1 time
(1, 2) occurred 1 time
(1, 7) occurred 1 time

                    <<<<< *PART OF LOG FILE REMOVED HERE* >>>>>

(5, 22) occurred 1 time
(5, 23) occurred 1 time
(5, 28) occurred 1 time
(5, 30) occurred 1 time
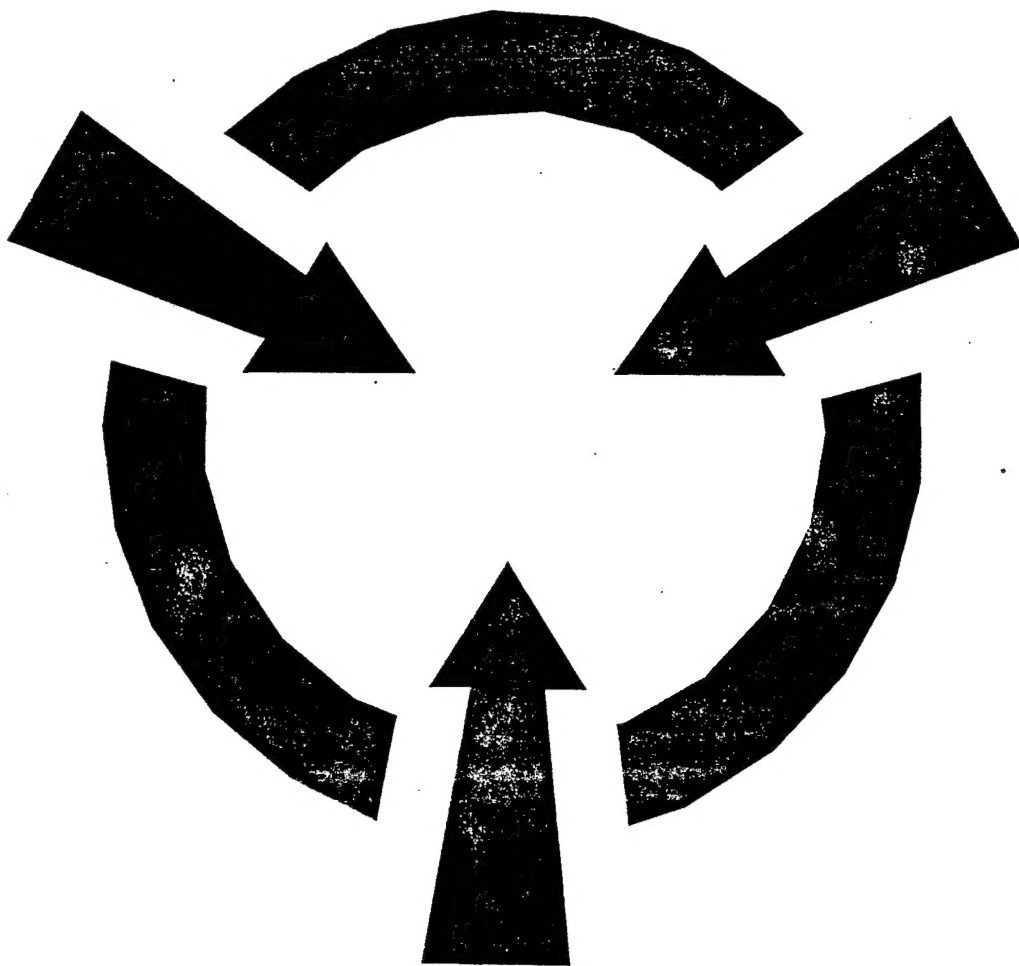(5, 34) occurred 20 times

12.1.3   Output cgm2draw/IslandDraw

CAUTION

cgm2draw/ID
C001

12.1.4 Output Freelance

CAUTION

12.1.5 Output IslandDraw v4.0

CAUTION